

and I shall be happy to have such for insertion in a paper now nearly ready on the Huyghenian region of this nebula."

For the convenience of such observers as may not have ready access to the "Annals of the Astronomical Observatory of Harvard College, vol. v.," which contains G. P. Bond's elaborate memoir on the nebula of Orion, the following differential positions of the stars mentioned by Prof. Holden, with reference to  $\theta^1$  Orionis, are extracted:—

Diff. R.A.	Diff. Decl.	Diff. R.A.	Diff. Decl.
No. 516 ... - 276°0 ... - 29°5		No. 652 ... + 30°2 ... + 17°6	
581 ... - 76°1 ... - 159°1		654 ... 33°2 ... + 10°0	
595 ... - 46°9 ... - 15°0		663 ... 55°5 ... + 147°1	
601 ... - 36°0 ... - 31°0		666 ... 59°7 ... - 195°8	
608 ... - 23°7 ... - 18°0		669 ... 63°3 ... + 100°0	
621 ... - 8°0 ... - 36°0		675 ... 74°5 ... - 93°4	
625 ... - 4 ... - 28		676 ... 78°5 ... - 27°6	
631 ... + 3 ... - 42		677 ... 78°6 ... - 201°4	
641 ... + 11°9 ... + 111°2		685 ... 97°7 ... - 95°0	
642 ... + 13 ... + 48		724 ... + 183°3 ... - 176°0	

It will be remarked that Prof. Holden states there are actually no stars within the trapezium. Mr. Burnham's experience with the 18½-inch refractor at Chicago is to the same effect; in the notes to his last catalogue of double stars, he writes: "Several observers have seen, or believe they have seen, other minute stars in the trapezium, most of them using comparatively small apertures. While making the measures given above, and at other times, under very favourable conditions, the interior of the trapezium and the vicinity of the principal stars were carefully examined. There was not the slightest suspicion of any additional stars. If the sixth star itself had been double, with a distance of 1"·0, it could not have been overlooked. I have very little faith in the real existence of these suspected stars after the failure of this and other large refractors to show them." And he considers it is wholly improbable that they should all be variable in such manner as to render them at all times invisible during the last few years. Telescopes were not so perfect forty years since as they are now, and we might be perhaps justified in attributing to optical illusion the supposed existence of the three stars within the trapezium, recorded by De Vico in 1839, and the star, near the "fifth," detected by Struve, which Gruithuisen claimed to have discovered about the same time, and which he says Schwabe had also seen with a 6-foot Fraunhofer. But what are we to say to the observations of Dr. Huggins, as detailed in vol. xxvi. of the *Monthly Notices* of the Royal Astronomical Society? They appear to point to something more than optical illusion, and notwithstanding the negative testimony as to the actual existence of stars within the trapezium, to render it desirable that a protracted examination of this region should be instituted with telescopes of suitable capacity. One of Dr. Huggins's stars is not far from the position of a star in De Vico's diagram (see *Memoria intorno a parecchie Osservazioni . . . in Collegio Romano, l'Anno 1839*, plate I., and Gruithuisen's *Astronomisches Jahrbuch*, 1841, p. 143).

THE TOTAL SOLAR ECLIPSE OF JANUARY 11.—A Reuter's telegram brings intelligence of the successful observation of the total phase in this eclipse on the Santa Lucia mountain, California, with the important addition that an intra-Mercurial planet has been again seen. In the longitude of this mountain the duration of totality upon the central line, employing the elements of the *Nautical Almanac*, would be only 38 seconds, with the sun at an altitude of 12°; if the semi-diameters adopted for eclipses in the American ephemeris are used, the duration would be even less—hardly 27 seconds. Under such circumstances it must have required very minute and skilful preparation and considerable smartness of execution to insure the results announced.

### GEOLOGICAL NOTES

THE MSS. of Sartorius von Waltershausen, descriptive of Etna, have been placed, we understand, in the hands of Prof. von Lasaulx, of Breslau, with a view to publication. They will complete the colossal pile which the veteran geologist erected to the glory of his favourite mountain.

ANOTHER distinguished and venerable vulcanologist, Dr. Abich has gone to Vienna to prepare his petrographical descriptions of the Caucasian region, in which he has been so long at work. The facilities for the most delicate analyses of rocks and

minerals at Vienna have likewise attracted thither M. Renard, of Brussels, who has been entrusted with the chemical and microscopic investigation of the abyssal deposits brought by the *Challenger* from its great ocean survey. M. Renard is at present in this country arranging with the *Challenger* Commission as to the prosecution and publication of his labours. His beautifully drawn plates which illustrate the more remarkable facts brought to light by the *Challenger* dredgings, are being exquisitely reproduced by chromolithography in Vienna.

IN a recent number of the *Bulletin* of the United States Geological and Geographical Survey of the Territories (a publication still continued for a while, though the Survey itself has ceased to exist), Dr. F. V. Hayden describes the Two Ocean Pass which has for some years been known to separate the head waters of the Yellowstone from those of the Snake River. He confirms and extends previous accounts of this interesting locality, showing that it is a flat meadow-like depression cut by erosion on the watershed. During wet weather this marshy ground becomes a lake which drains both ways, one branch finding its way into the Pacific, and the other into the Atlantic, by one of the longest routes for running water on the surface of the planet.

PROF. MARSH continues his descriptions of the fossil treasures continually arriving to increase the already ample stores at Yale College. He remarks that while the Mosasauroid reptiles are so rare in Europe that the type-specimen described by Cuvier still remains the most perfect yet discovered here, and the only one from which important characters have been made out, in North America the group attained a marvellous development, and was represented by several families with numerous genera and species, of which the relics of not less than 1,400 distinct individuals are contained in the museum at Yale.

DR. MICHEL MOURLON of Brussels has in preparation a work on the geology of Belgium. It will form an octavo volume of at least 500 pages, containing full descriptions of the different geological formations, with unpublished plates of the microscopic structure of rocks, copious lists of fossils, and an account of the industrial resources of each formation, and will be followed by a complete bibliography of the geology, palaeontology, and lithology of Belgium. The re-issue of Dumont's beautiful and most trustworthy geological map of Belgium naturally suggests the desirability of some general guide to the public in perusing the map or travelling through the country, for the admirable *prodrome* of M. Dewalque can hardly now be procured. Dr. Mourlon's position as one of the Conservateurs of the Royal Museum of Natural History, and his experience as a field geologist both before and since his connection with the Geological Survey of Belgium, give him exceptional advantages for the preparation of such a work, which will no doubt be as duly appreciated by his fellow-countrymen as it will be welcomed by students of geology abroad.

### PHYSICAL NOTES

OBSERVATIONS of phosphorescence phenomena in high vacua of the nature described by Crookes and Maskelyne have been lately made on a variety of substances by Herr Stürtz of Bonn, in company with Herr Müller (*Wied. Ann.* No. 11). The following substances gave phosphorescence (those marked with an asterisk were made red hot before being brought into the tube; in the ordinary state they showed little or no phosphorescence):—Brucite,\* magnesite,\* phosphate of magnesia, pitch-blende, wolframite, cerusite, adularia, orthoclase,\* kaolin,\* axinite,\* silicate of zinc,\* zinc-spar,\* double spar, apatite, franklinite, azure spar, fergusonite,\* apophyllite,\* dolomite, celestine,\* red spinelle, cobalt-glauc, stannite, baryta, chromate of iron, lazulite, lepidolite, zinnwaldite, ankerite, greenockite, pectolith, borax, cinnabar, leucite, sanidin, and Java meteoric stone of 1869. A few luminous points were observed in crystals of arsenical iron and antimonite. Pieces of a phosphorescent substance made red hot are luminous with a different colour from that of pieces of the same not made red hot. In cerusite the phosphorescence is lost through heating. The authors give a list of substances which do not phosphoresce.

A SYSTEM of electrical storing, considered to be free from the disadvantages of other systems, is described by Professors Houston and Thomson in the Franklin Institute *Journal* for December, 1879. They use a saturated solution of zinc sulphate in a suitable vessel, having at the bottom a plate of copper, to

which is connected an insulated wire. At or near the top of the vessel, and immersed in the solution, is placed a second copper plate or one of hard carbon, or metal unchanged by contact with zinc sulphate solution and less positive than metallic zinc; this is also connected with a wire. A current from a dynamo-electric machine is sent in the direction from the lower to the upper plate, the result being deposition of metallic zinc on the upper plate and the formation of a dense solution of copper sulphate overlying the under plate. The cell, after charging, constitutes a gravity cell, and continues a source of electrical current till re-conversion of all the copper sulphate into zinc sulphate, with deposition of copper on the lower plate and removal of zinc from the upper. The cells, in charging, may be arranged in multiple arc or in series, and differently from that in discharging, according to the object. The authors believe it possible to store and recover 50 per cent. or more of the 50 or 60 per cent. which good dynamo-electric machines realise in external work of the power used in driving them. Thus 25 per cent. of the original power may be given out secondarily as electric current. Assuming that in the best steam engines 20 per cent. of the heat energy of the coal may be utilised, then about 5 per cent. of the heat energy, it is thought, may be recovered after storage as current; but even with this small percentage the economy would be much superior to the use of zinc and other materials in the ordinary battery in production of current.

In a recent paper to the Vienna Academy, by Prof. Exner, on the theory of instant galvanic elements, proof is offered that there is no so-called galvanic polarisation in elements, but that the phenomena referred thereto are attributable to the oxygen dissolved in water. The electromotive force of an element with only one liquid appears accordingly as a constant which is in no way affected by any polarisation of the negative pole. It is further shown that the force of a Smee element is not altered when its platinum is replaced by some other metal, provided only this does not itself give rise to chemical processes.

### GEOGRAPHICAL NOTES

DR. EMIL HOLUB will read a paper before the Royal Geographical Society next Monday evening on his journey from the Diamond Fields through South Central Africa to the upper waters of the Zambesi. Dr. Holub, we understand, has for some time been exhibiting at Prague a small museum of zoological and ethnographical curiosities collected during his various journeys in Southern Africa, which has attracted much attention, and he is coming to England to attend this meeting at the special invitation of the Council of the Geographical Society.

*The Colonies and India* reports the return of Mr. Alexander Mitchinson after some years spent in Africa. He appears to have arrived on the Gambia in 1876, and to have journeyed with a small number of followers into various parts of Africa. Following the course of the Niger, he visited the waterfalls, and returning to the west coast, made excursions into the country in various directions. After a brief rest his travels were again resumed, and from the Gaboon country Mr. Mitchinson made his way into Angola, and from Benguela proceeded *via* Bihe to Lake Ngami, returning to the coast at Walvisch Bay at the end of 1879. The notes which he made in the course of his travels, are said to contain much interesting matter.

In the current number of the *Tour du Monde* M. Desire Charnay, the well-known archaeological explorer of Southern Mexico, Yucatan, and Madagascar, has commenced an account of what he saw during the six months he recently spent in Australia. His observations on the aborigines, their legends, customs, and traditions will no doubt be interesting, and his story will certainly be well illustrated. M. Charnay, who returned to Europe not long since, had, previously to his visit to Australia, spent some time in the East Indian Archipelago.

DR. BENJAMIN BRADSHAW, who was met by Major Serpa Pinto, during his famous journey near the Zambesi, and who was also with the late Mr. Frank Oates when he died near the Tati settlement on his way from the Victoria Falls, arrived in Capetown a short time ago, presumably to make another trial of the ways of civilisation. Dr. Bradshaw has spent a long time in the Matabele country and other parts of the Zambesi basin, living the life of the natives and making zoological collections for his own amusement and benefit. During his wanderings he has acquired a considerable amount of information respecting the less-known parts of the Zambesi and some of its tributaries,

which, we have reason to hope, may be made public before long.

A CORRESPONDENT in the *Glasgow Herald* advocates the formation of a geographical society in that great commercial centre, the second most populous city in the kingdom. We have on several occasions pointed out the advantages of the formation of such societies in our chief ports, by means of which much useful information might be tapped that otherwise would not see the light. No better field could be found for such a society than Glasgow.

PROF. NORDENSKJÖLD and his staff evidently do not consider that their work was finished when they got outside Behring's Strait in the *Vega*. During the brief stay of the ship at Galle they made excursions into the island to examine its mineralogy and natural history. Great preparations have been made for the reception of the *Vega* at Naples. The King of Sweden desires that the professor and the captain should visit Rome, Brussels, Paris, and London, and join the vessel again at Copenhagen, to be ultimately received at Stockholm.

DR. OTTO FINSCH left Honolulu on July 30 last, on board the barque *Hawaii*, and arrived at Dshaloot, on the island of Bonham (the principal island of the Marshall group) on August 21. He intended to investigate this island thoroughly, as it appears that this has never before been done in a scientific manner. From Bonham Dr. Finsch will proceed to the islands of the Radak group.

News from Dr. Stecker, the well-known companion of Dr. Gerhard Rohlfs, stated that he was going to leave Benghazi at the beginning of the present month, in order to proceed to Bornu by way of Fezan.

A FRENCH Company intends to cut a canal through the Isthmus of Corinth. Steps have already been taken to obtain the permission of the Greek Government.

THE German residents of Sydney have founded a branch of the Berlin Central Union for Commercial Geography.

MR. IM THURN, of the Georgetown Museum, whose labours in British Guiana have been referred to in NATURE, arrived in England last week.

### THE SIXTH CONGRESS OF RUSSIAN NATURALISTS

THE Sixth Congress of Russian naturalists began at St. Petersburg on January 1, by a public meeting in the great hall of the University. The number of members present was very large—1,200—of whom 500 were from the provinces, and thirty-eight were ladies. Prof. Kessler was unanimously elected President, but the bad state of his health not allowing him to fulfil this function, he was made honorary president, Prof. Beketoff being elected as the active one.

At the first public meeting, Prof. Wagner gave an interesting address on the "Means of Solution of the complicated Problems of Natural Science," and after a brilliant sketch of the methods of science, he drew the attention of naturalists to the necessity of the study of physiological chemistry, and especially of the problems connected with albuminous matters.

Two proposals were then discussed:—On the scientific exploration of Bulgaria, and on the necessity of making complete botanical collections of Russian plants.

The second public meeting of the Congress, held on January 7, was opened by an address by Prof. Timiriazeff, on the physiological significance of chlorophyll in the life of plants, on the absorption by it of solar rays, and on the limits of the productivity of the soil. After this the president proposed that the several projects of scientific inquiries approved by the Congress be transmitted to a special committee, which would remain as a permanent institution after the Congress, and see to the carrying out of these projects; the proposal was unanimously accepted by the Congress, and will be accomplished, if the Ministry of Public Instruction does not oppose, as it has done hitherto, the creation of a permanent scientific association of all Russian naturalists. Prof. Mendeleef proposed the publication of a popular description of Russian colonies, being a sketch of their climate, soil, flora, fauna, and economical conditions; the proposal was approved. Prof. Dobroslavine gave an address on the relations between natural sciences and hygiene. The latter has only one point in common with medicine—general pathology—whilst any progress in the department would be impossible if it were not for